MEMORANDUM **Case # 23-09**

DATE: May 25, 2023

TO: MAG Specifications and Details Committee Members

FROM: Warren White, City of Chandler Representative

SUBJECT: Proposed New Section 632 Water & Sanitary Sewer Tracer Wire Installation

Proposing to add a new Section 632 for installation of tracer wire for water and sanitary sewer systems. Per ARS 40-360.22 Excavations, locator wire (aka tracer wire) is an acceptable method to meet the requirements to determine location of underground facilities. In addition to adding the new installation specification, revisions to Section 610, 615 & 616 will be needed to reference the new Section 632. New construction details are also proposed to show tracer wire trench, connections, and tracer wire for water services, fire hydrants, sewer services and manholes. In summary, here is what is included in this case.

- Section 632 Water & Sanitary Sewer Tracer Wi re Installation (New)
- Section 610 Water Line Construction (Revised)
- Section 615 Sanitary Sewer Line Construction (Revised)
- Section 616 Reclaimed Water Line Construction (Revised)
- Detail 399-1 Tracer Wire & I.D. Tape Installation (New)
- Detail 399-2 Tracer Wire Connections (New)
- Detail 399-3 Tracer Wire for Water Services (New)
- Detail 399-4 Tracer Wire for Fire Hydrants (New)
- Detail 399-5 Tracer Wire for Sewer Services (New)
- Detail 399-3 Tracer Wire for Sewer Manholes (New)

*Tracer wire spec and details are based on this document from Minnesota Rural Water Association/Utility Logic.

SECTION 632 (NEW)

WATER & SANITARY SEWER TRACER WIRE INSTALLATION

632.1 DESCRIPTION:

The installation of tracer wire for water and sanitary sewer mains, services and other appurtenances shall conform to this specification and Detail 399, except as otherwise required on the plans or as modified in the special provisions.

632.2 MATERIALS:

632.2.1 General:

All tracer wire and tracer wire products shall be domestically manufactured in the U.S.A.

All tracer wire shall meet ASTM B1010/B1010M-19 Standard Specification for Copper-Clad Electrical Conductor for Tracer Wire Applications.

All tracer wire shall have HDPE insulation intended for direct bury, color coated per APWA standard for the specific utility being marked.

632.2.2 Tracer Wire:

- Open Trench - Tracer wire shall be #12 AWG Copper Clad Steel, High Strength with minimum 450 lb. break load, with minimum 30 mil HDPE insulation thickness.
- Directional Drilling/Boring - Tracer wire shall be #~~12~~ 10 AWG Copper Clad Steel, Extra High Strength with minimum 1,150 lb. break load, with minimum 30 mil HDPE insulation thickness.
- Pipe Bursting/Slip Lining - Tracer wire shall be 7 x 7 Stranded Copper Clad Steel, Extreme Strength with 4,700 lb. break load, with minimum 50 ml HDPE insulation thickness.

632.2.3 Connectors:

- All mainline tracer wires must be interconnected in intersections, at mainline tees and mainline crosses. At tees, the three wires shall be joined using a single 3-way lockable connector. At Crosses, the four wires shall be joined using a 4-way connector. Use of two 3-way connectors with a short jumper wire between them is an acceptable alternative.
- Direct bury wire connectors – shall include 3-way lockable connectors and mainline to lateral lug connectors specifically manufactured for use in underground tracer wire installation. Connectors shall be dielectric silicon filled to seal out moisture and corrosion and shall be installed in a manner so as to prevent any uninsulated wire exposure.
- Connections necessary to join ends of tracer wire shall be made using a direct bury wire nut.
- Non locking friction fit, twist on or taped connectors are prohibited except as noted for joining ends of tracer wire.
- See Detail 399 for connection details.

632.2.4 Termination/Access:

- All tracer wire termination points must utilize an agency approved tracer wire access box (above ground access box or grade level/in-ground access box as applicable), specifically manufactured for this purpose.
- All grade level/in-ground access boxes shall be appropriately identified with “sewer” or “water” cast into the cap and be color coded.
- A minimum of 2 ft. of excess/slack wire is required in all tracer wire access boxes after meeting final elevation.

- All tracer wire access boxes must include a manually interruptible conductive/connective link between the terminal(s) for the tracer wire connection and the terminal for the grounding anode wire connection.
- Grounding anode wire shall be connected to the identified (or bottom) terminal on all access boxes.
- Service Laterals on public property - Tracer wire must terminate at an approved grade level/in- ground tracer wire access box, located at the edge of the road right-of-way, and out of the roadway.
- Service Laterals on private property - Tracer wire must terminate at an approved above-ground tracer wire access box, affixed to the building exterior directly above where the utility enters the building, at an elevation not greater than 5 vertical feet above finished grade, or terminate at an approved grade level/in-ground tracer wire access box, located within 2 linear feet of the building being served by the utility.
- Hydrants – Tracer wire must terminate at an approved above-ground tracer wire access box, properly affixed to the hydrant grade flange. (affixing with tape or plastic ties shall not be acceptable)
- Long-runs, in excess of 500 linear feet without service laterals or hydrants - Tracer wire access must be provided utilizing an approved grade level/in-ground tracer wire access box, located at the edge of the road right-of-way, and out of the roadway. The grade level/in-ground tracer wire access box shall be delineated using a minimum 48" polyethylene marker post, color coded per APWA standard for the specific utility being marked.

632.2.5 Grounding:

- Tracer wire must be properly grounded at all dead ends/stubs.
- Grounding of tracer wire shall be achieved by use of a drive-in magnesium grounding anode rod with a minimum of 20ft of #12 red HDPE insulated copper clad steel wire connected to anode (minimum 1.5 lb.) specifically manufactured for this purpose and buried at the same elevation as the utility.
- When grounding the tracer wire at dead ends/stubs, the grounding anode shall be installed in a direction 180 degrees opposite of the tracer wire, at the maximum possible distance.
- When grounding the tracer wire in areas where the tracer wire is continuous and neither the mainline tracer wire or the grounding anode wire will be terminated at/above grade, install grounding anode directly beneath and in-line with the tracer wire. Do not coil excess wire from grounding anode. In this installation method, the grounding anode wire shall be trimmed to an appropriate length before connecting to tracer wire with a mainline to lateral lug connector.
- Where the anode wire will be connected to a tracer wire access box, a minimum of 2 ft. of excess/slack wire is required after meeting final elevation.

632.3 INSTALLATION:

632.3.1 General:

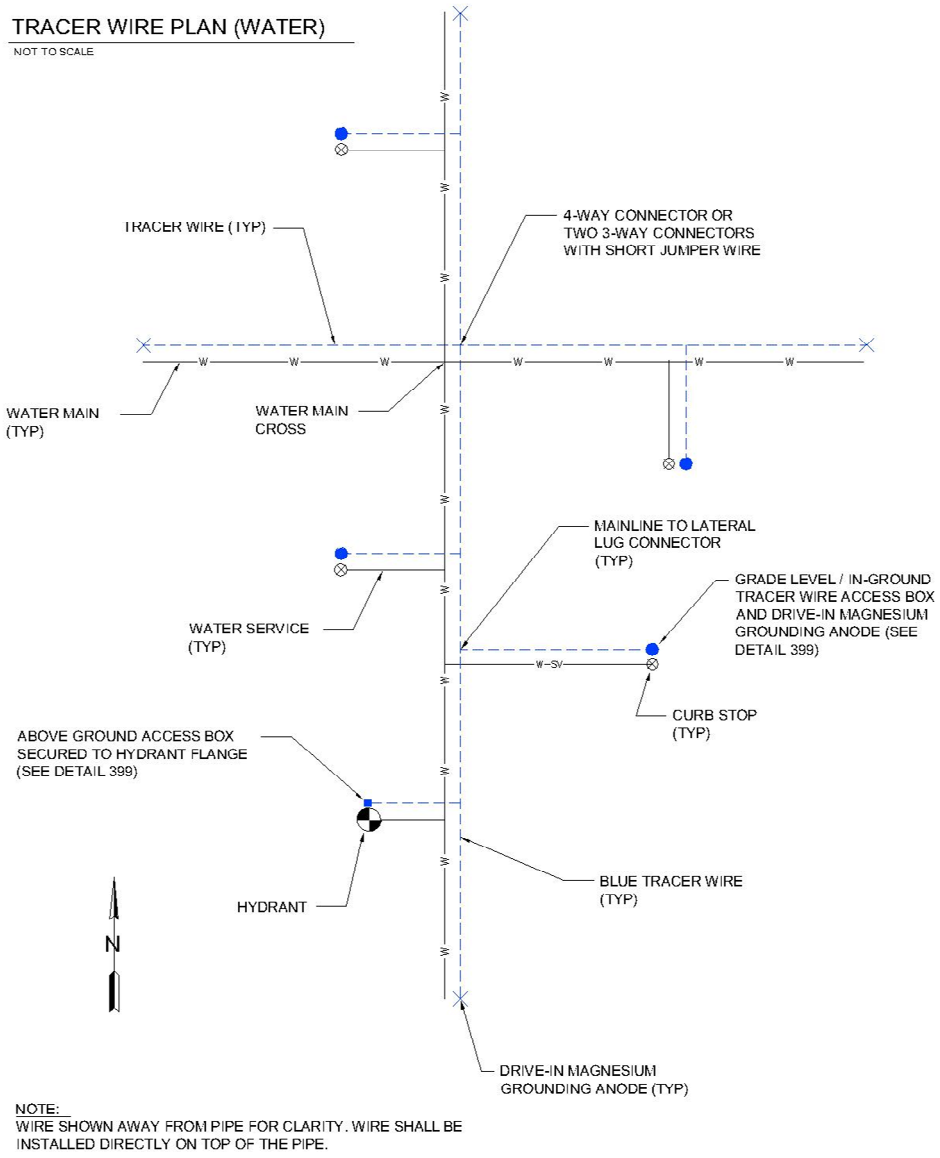
- Tracer wire installation shall be performed in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency(512Hz) signal for distances in excess of 1,000 linear feet, and without distortion of signal caused by multiple wires being installed in close proximity to one another.
- Tracer wire systems must be installed as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed.
- Any damage occurring during installation of the tracer wire must be immediately repaired by removing the damaged wire, and installing a new section of wire with approved connectors. Taping and/or spray coating shall not be allowed.
- Tracer wire shall be placed directly to the top of the pipe and secured (taped/tied) at 8 ~~10'~~ ft intervals for open trench installations and every 4 ft for directional boring installations~~.~~

- Tracer wire must be properly grounded as specified.
- Tracer wire on all service laterals/stubs must terminate at an approved tracer wire access box located directly above the utility, at the edge of the road right-of-way, but out of the roadway. (See Termination/Access)
- At all mainline dead-ends, tracer wire shall go to ground using an approved connection to a drive-in magnesium grounding anode rod, buried at the same depth as the tracer wire. (See Grounding)
- Mainline tracer wire shall not be connected to existing conductive pipes. Treat as a mainline dead- end, ground using an approved waterproof connection to a grounding anode buried at the same depth as the tracer wire.
- All service lateral tracer wires shall be a single wire, connected to the mainline tracer wire using a mainline to lateral lug connector, installed without cutting/splicing the mainline tracer wire.
- In occurrences where an existing tracer wire is encountered on an existing utility that is being extended or tied into, the new tracer wire and existing tracer wire shall be connected using approved splice connectors and shall be properly grounded at the splice location as specified.
- Tracer wire, anodes, and connection stations (access box, etc.) shall be detailed on the construction plan and As-Built drawings.

632.3.2 Water System:

- A mainline tracer wire must be installed, with all service lateral tracer wires properly connected to the mainline tracer wire, to ensure full tracing/locating capabilities from a single connection point.
- Lay mainline tracer wire continuously, by-passing around the outside of valves and fittings on the North or East side.
- Tracer wire on all water service laterals must terminate inside meter box or at an approved tracer wire access box color coded blue and located directly above the service lateral at the edge of road right of way.
- Above-ground tracer wire access boxes will be installed on all fire hydrants.
- All conductive and non-conductive service lines shall include tracer wire.
- See Figure 632-1 for a schematic sample plan.

Figure 632-1

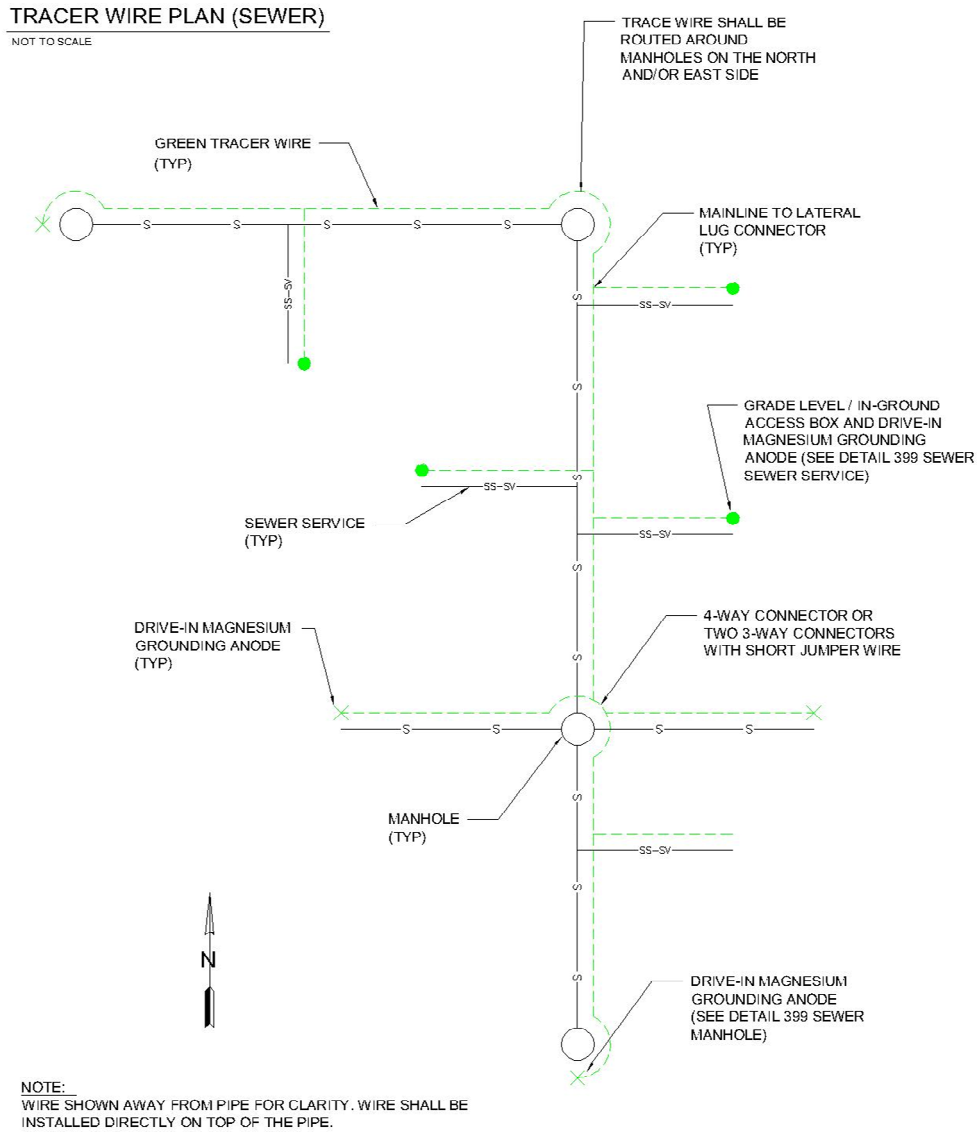


632.3.2 Sanitary Sewer System:

- A mainline tracer wire must be installed, with all service lateral tracer wires properly connected to the mainline tracer wire, to ensure full tracing/locating capabilities from a single connection point.
- Lay mainline tracer wire continuously, by-passing around the outside of manholes/structures on the North or East side.

- Tracer wire on all sanitary service laterals must terminate at an approved tracer wire access box color coded green and located directly above the service lateral at the edge of road right of way.
- See Figure 632-2 for a schematic sample plan.

Figure 632-2



632.3.2 Storm Sewer System:

This section shall be included at the discretion of the facility owner.

- If the storm sewer system includes service laterals for connection of private drains and tile lines, it shall be specified the same as a sanitary sewer application.

- Lay mainline trace wire continuously, by-passing around the outside of manholes/structure on the North or East side.

632.4 PROHIBITED PRODUCTS AND METHODS:

The following products and methods shall not be allowed our acceptable.

- Uninsulated tracer wire
- Tracer wire insulations other than HDPE
- Tracer wires not domestically manufactured
- Non locking, friction fit, twist on or taped connectors
- Brass or copper ground rods
- Wire connections utilizing taping or spray-on waterproofing
- Looped wire or continuous wire installations, that has multiple wires laid side-by-side or in close proximity to one another
- Tracer wire wrapped around the corresponding utility line
- Brass fittings with tracer wire connection lugs
- Wire terminations within the roadway, i.e. in valve boxes, cleanouts, manholes, etc.
- Connecting tracer wire to existing conductive utilities

632.5 TESTING:

- All new tracer wire installations shall be located using typical low frequency (512Hz) line tracing equipment, witnessed by the contractor, engineer and facility owner as applicable, prior to acceptance of ownership.
- This verification shall be performed upon completion of rough grading and again prior to final acceptance of the project.
- All new tracer wire shall be tested and verified by the Agency or approved third party testing contractor to ensure that there are no breaks in the wire prior to any paving operation.
- Continuity testing in lieu of actual line tracing shall not be accepted.

632.6 MEASUREMENT AND PAYMENT:

Measurement and payment shall be included with water line and sewer line construction.

End of Section -

Identification Tape shall be installed on all water mains and service lines as shown on Detail 399-1.

Tracer Wire shall be installed on all water mains and service lines per Section 632 and Detail 399, as required by Agency.

SECTION 610

WATER LINE CONSTRUCTION

610.1 DESCRIPTION:

The construction of all water lines shall conform to applicable standard specifications and details, except as otherwise required on the plans or as modified in the special provisions.

610.2 GENERAL:

All pipes shall be delivered, handled and installed in accordance with the manufacturer's recommendations and/or applicable provisions of AWWA standards for installation of the various types of water mains specified, insofar as such recommendations and provisions are not in variance with the standard specifications and details.

Where water lines are to be constructed in new subdivisions or in conjunction with street repaving projects, the streets shall be pre-graded to within 6 inches of the new street subgrade prior to trenching or cut stakes shall be set for trenching.

610.3 MATERIALS:

All pipes for water lines shall be of the classes shown on the plans or as specified below.

(A) The 4-inch through 16-inch diameter pipe sizes may be PVC C900 or ductile iron, except where a particular material is specified by the agency or the contract documents. All pipes shall be minimum 150 psi design unless otherwise specified.

(B) Pipe 16 inches and larger may be either ductile iron, or concrete pressure pipe-steel cylinder type.

Ductile iron and cast iron water pipe and fittings per: Section 750. Concrete pressure pipe-steel cylinder type per: Section 758. C900 PVC per: AWWA C900-07.

Service material containing brass or bronze must comply with the current NSF 61-8 standards at the time the project begins.

All brass or bronze service material must meet the current AWWA C800 standards.

Any product used in water line construction containing brass or bronze that comes in contact with potable water shall meet the current NSF standards and federal law.

Only such packing materials as are included in the list of acceptable materials in AWWA C600 for installation of cast iron water main shall be used. The packing materials shall be handled in such a manner as to avoid contamination, and shall be dry when placed in the joints. All such materials shall be free of oil, tar, or greasy substances, except that treated paper packing material, jute, cement, or sulfur compound caulking will not be permitted.

610.4 CONSTRUCTION METHODS:

610.4.1 Trenching/Cover: All water mains in major streets shall have a minimum cover of 48 inches over the top of the pipe. Water mains in other locations shall have a minimum cover over the top of the pipe as follows:

(A) 36 inches for mains smaller than 12 inches.

(B) 48 inches for mains 12 inches and larger.

Cover for water mains will be measured from existing or proposed finished grade of pavement or from natural ground, whichever is deeper.

Except as otherwise required in this specification, the special provisions, or by the Engineer, trench excavation, backfilling and compaction shall be in accordance with the requirements of Section 601. Backfilling may be accomplished as soon as the pipeline has been installed to the satisfaction of the Engineer, subject to the requirements for testing per Section 611.

615.2 General

Identification Tape shall be installed on all sewer mains and service lines as shown on Detail 399-1.

Tracer Wire shall be installed on all sewer mains and service lines per Section 632 and Detail 399, as required by Agency.

SECTION 615

SANITARY SEWER LINE CONSTRUCTION

615.1 DESCRIPTION:

The construction or extension of sanitary sewer lines shall conform to the applicable standard specifications and details, except as otherwise required on the plans or as modified in the special provisions.

615.2 MATERIALS:

Renumber 615.3 and down

Pipe used for sewer line construction, including specials, joints, and gaskets, shall be according to the following Sections, or as modified by the special provisions.

- Reinforced Concrete Pipe (RCP), see Section 735
- High Density Polyethylene (HDPE) Pipe, see Section 738
- Steel Reinforced Polyethylene (SRPE) Pipe, see Section 739
- Polypropylene Pipe (PP), see Section 740
- Vitrified Clay Pipe (VCP), see Section 743
- Polyvinylchloride Pipe (PVC), see Section 745
- Ductile Iron Pipe (DIP), see Section 750

615.3 TRENCHING:

Trench excavation shall be accomplished in accordance with Section 601, except as specified below, or as modified by special provisions.

The Engineer shall furnish the Contractor alignment and elevation stakes at agreed-upon intervals and offset together with cut sheets showing the difference in elevation from the top of the stakes to the flow line of the pipe.

The trench shall be dry when the fine grading of the trench bedding is accomplished. Before placement of pipe, the fine grade shall be carefully checked by use of a string line, laser beam, or other means so that when in final position the pipe will be true to line and grade, ±0.05 feet for 12 inch and smaller diameter pipe and ±0.10 feet for 15 inch and larger diameter pipe.

615.4 SEPARATION:

To protect water lines from contamination by sewer lines, separation and extra protection shall be in accordance with Section 610.

Sewer lines that are constructed of ductile iron pipe for extra protection shall be internally lined for sewer service.

615.5 PIPE INSTALLATION:

Pipe shall be of the type, class, and size called for on the plans. All pipe shall be protected during handling against impact shocks and free falls. No damaged or defective pipe shall be installed in the work. Pipe shall be kept clean at all times, and as the work progresses, the interior of the pipe shall be cleared of all dirt and superfluous materials of every description.

The laying of the pipe shall be in trenches free from water or debris, and shall commence at the lowest point, with the spigot ends pointing in the direction of the flow. Each pipe shall be laid firmly and true to line and grade, in such manner as to form a closed concentric joint with the adjoining pipe and to prevent sudden offsets of the flowline. Any adjustment to line and grade shall be made by scraping away or filling in under the body of the pipe, never by wedging or blocking under the pipe ends.

The alignment and grade of each length of pipe shall be checked after setting by measurement from the string line, laser beam target or other means approved by the Engineer.

At all times when work is not in progress, open ends of the pipe and fittings shall be securely closed to the satisfaction of the Engineer, so that no water, earth or other substance will enter the pipe or fittings.

Identification Tape shall be installed on all reclaimed mains and service lines as shown on Detail 399-1.

Tracer Wire shall be installed on all reclaimed mains and service lines per Section 632 and Detail 399, as required by Agency.

SECTION 616

RECLAIMED WATER LINE CONSTRUCTION

616.1 GENERAL:

This specification prescribes standards for utility water mains for the purpose of conveying, under pressure, reclaimed water for permitted reuse. Installation of reclaimed water mains shall be constructed in accordance with these specifications for materials, installation, and identification.

616.2 MATERIALS:

Pipe materials shall be in accordance with Section 610.

Valves shall be in accordance with Sections 610 and 630.

Valve boxes shall be in accordance with Section 345, this Section and Detail 391-1 and 391-2. Frame and cover shall be in accordance with Detail 271, or per Agency requirements. Manholes shall be in accordance with Section 625, 787, this Section, and applicable Details.

616.3 INSTALLATION:

Pipe shall be installed in accordance with Sections 601, 610, and this Section.

Valves and risers shall be installed in accordance with this Section.

Valve box debris caps shall be installed in accordance with this Section and Detail 392.

When a reclaimed water main is adjacent to or crosses a potable water main, the reclaimed water main shall be considered a pressure or force sanitary sewer and comply with Details 404-1, 404-2 and 404-3 for separation and/or protection. When reclaimed water main is adjacent to or crosses a gravity, pressure or force sanitary sewer, the reclaimed water main shall be considered a potable water main and comply to Detail 404-1, 404-2 and 404-3 for separation and/or protection.

616.4 IDENTIFICATION:

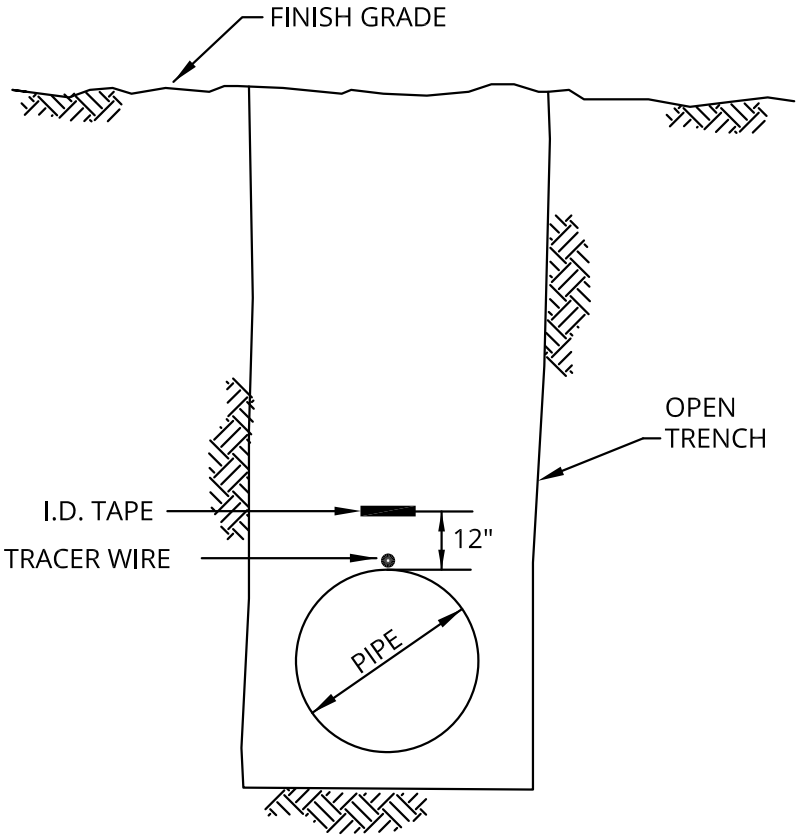
The color purple shall be used for identifying all pipes, valves, and other equipment used for conveying reclaimed water.

Reclaimed water identification tape shall be an inert polyethylene plastic impervious to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil. The tape shall be a minimum of 4.0 mils thick and no less than 3 inches wide. The tape shall be purple and shall have the words, “CAUTION: RECLAIMED WATER LINE” or similar wording printed in black lettering continuously along the entire length. Lettering shall be a minimum 1 ½ inches high. Spacing between the individual words of the message shall not exceed three inches.

Reclaimed water identification sleeving (pipe socks) shall be an inert polyethylene plastic that is impervious to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil. The sleeving shall be a minimum of 4.0 mils thick. The sleeving shall be purple and shall have the words, “CAUTION: RECLAIMED WATER LINE” or similar wording printed in black lettering continuously along the entire length. Lettering shall be a minimum 1 ½ inches high. Spacing between the individual words of the message shall not exceed three inches.

Reclaimed water identification decals shall be made of inert material resistant to cracking, peeling, and fading due to sunlight and heat. Decals shall have an aggressive adhesive to ensure permanent bonding to the surface that is being identified. The decals shall have the words, “CAUTION: RECLAIMED WATER - DO NOT DRINK” or similar wording printed in black lettering on a purple background. Lettering shall be a minimum 1-inch high. Spacing between the individual words of the message shall not exceed three inches.

Reclaimed water pipe identified by stenciling shall use paint or ink resistive to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil. Stenciled pipe shall have the words, “CAUTION: RECLAIMED WATER - DO



IDENTIFICATION TAPE & WIRE COLOR AND MARKING SCHEDULE

PIPELINE USE	COLOR	PRINTED MESSAGE
RECLAIMED WATER	PER SECTION 616.4	PER SECTION 616.4
POTABLE WATER	SOLID COLUMBIA BLUE	CAUTION POTABLE WATER LINE
SEWER	GREEN	CAUTION: SANITARY SEWER

NOTES:

1. TRACER WIRE INSTALLATION INCLUDING MATERIALS (WIRE, CONNECTORS, TERMINATION, & GROUNDING) PER SECTION 632.
2. IDENTIFICATION (I.D.) TAPE AND TRACER WIRE MUST BE INSTALLED ON PUBLIC DISTRIBUTION AND COLLECTION MAINLINES AND SERVICES FOR ALL PIPE MATERIALS.

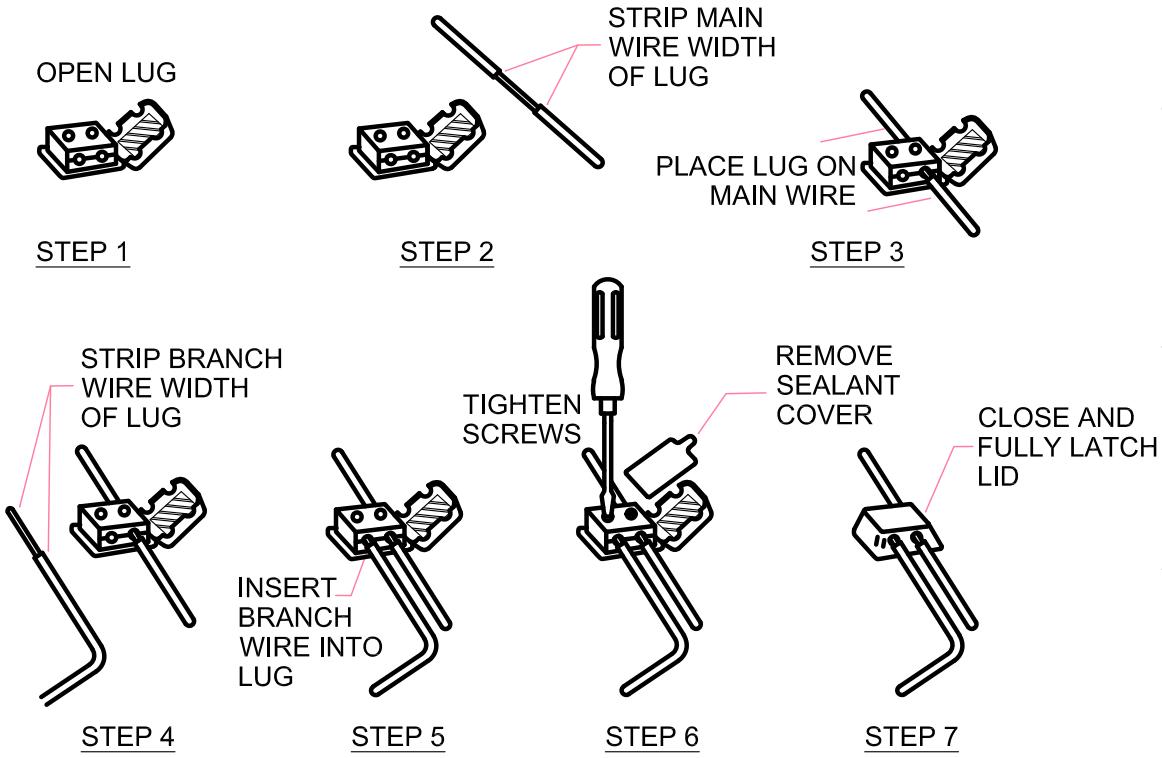


FIGURE 2
DIRECT BURY LUG CONNECTION

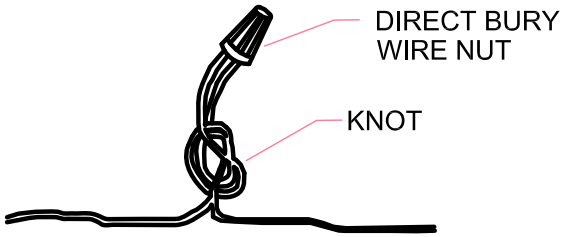


FIGURE 1
DIRECT BURY WIRE NUT CONNECTION

NOTES:

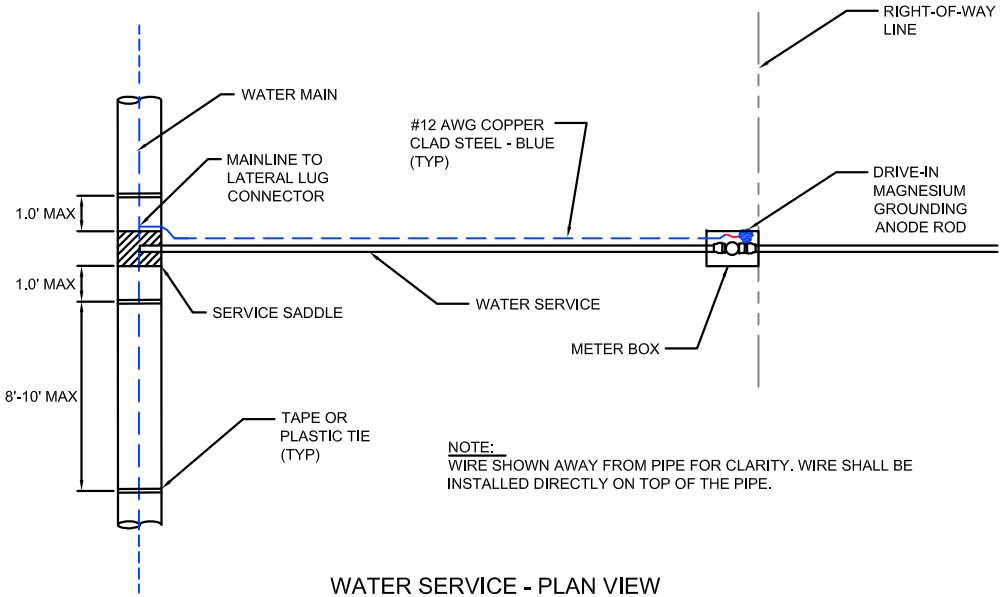
1. JOINING ENDS OF TRACER WIRE: CONNECTIONS INTO EXISTING TRACER WIRE, CONNECTIONS INTO TRACER WIRE USED DURING WATER MAIN BORES, CONNECTIONS BETWEEN ONE SPOOL OF TRACE WIRE TO ANOTHER, AND OTHER SIMILAR CONNECTIONS SHALL BE MADE USING A DIRECT BURY WIRE NUT.

2. WHEN CONNECTING TRACER WIRE ENDS TOGETHER, STRIP $\frac{5}{8}$" OF INSULATION FROM THE END OF EACH WIRE. INSERT TWO ENDS FIRMLY INTO THE DIRECT BURY WIRE NUT. TWIST THE WIRE NUT CLOCKWISE WHILE PUSHING THE WIRES FIRMLY INTO THE NUT. DO NOT OVER TORQUE. TIE THE WIRES IN A KNOT AS SHOWN IN FIGURE 1.

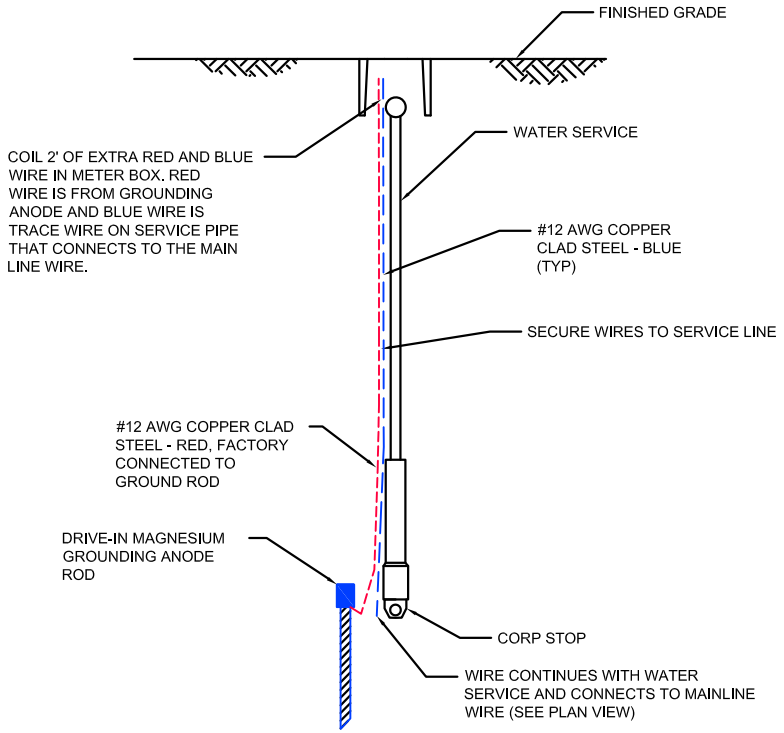
3. JOINING TRACER WIRE - BRANCH TO MAIN: CONNECTIONS OF TRACER WIRE AT TEES, CROSSES, AND AT LOCATIONS WHERE THE TRACER WIRE WILL BE BROUGHT TO THE SURFACE SHALL BE CONDUCTED USING A DIRECT BURY LUG. REFER TO FIGURE 2 FOR THIS CONNECTION STYLE.

4. DIRECT BURY WIRE NUTS & DIRECT BURY LUGS PER AGENCY APPROVED PRODUCTS LIST.

DETAIL NO.				REVISED	DETAIL NO.
399-2	MARICOPA ASSOCIATION of GOVERNMENTS STANDARD DETAIL ENGLISH	TRACER WIRE CONNECTIONS		01-01-2024	399-2



WATER SERVICE - PLAN VIEW
NOT TO SCALE

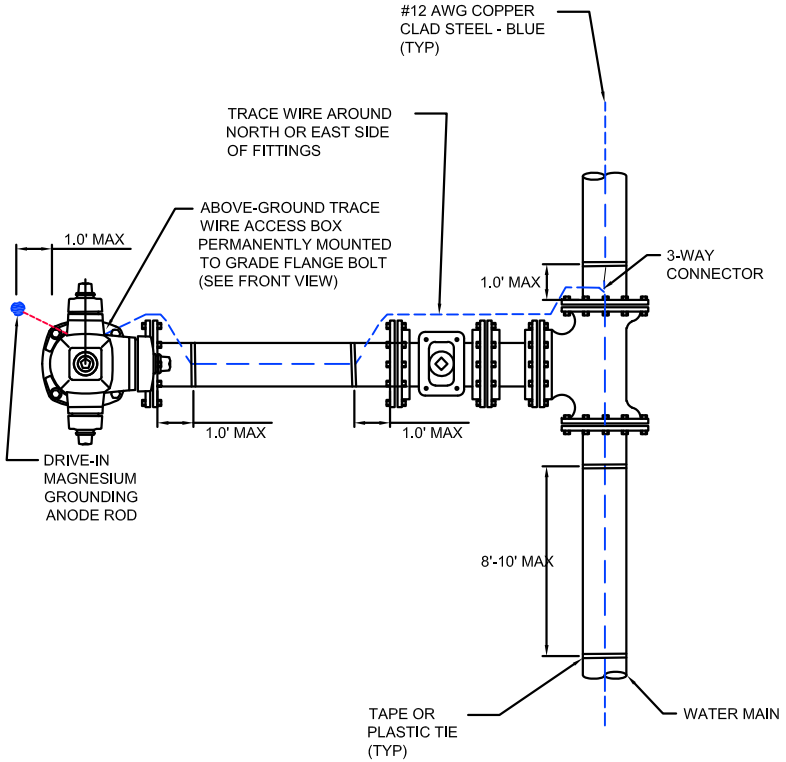


WATER SERVICE - SECTION VIEW
NOT TO SCALE

NOTES:

1. TRACER WIRE INSTALLATION INCLUDING MATERIALS (WIRE, CONNECTORS, TERMINATION, & GROUNDING) PER SECTION 632.

DETAIL NO.			REVISED	DETAIL NO.
399-3	MARICOPA ASSOCIATION of GOVERNMENTS STANDARD DETAIL ENGLISH	TRACER WIRE FOR WATER SERVICE	01-01-2024	399-3



HYDRANT - PLAN VIEW

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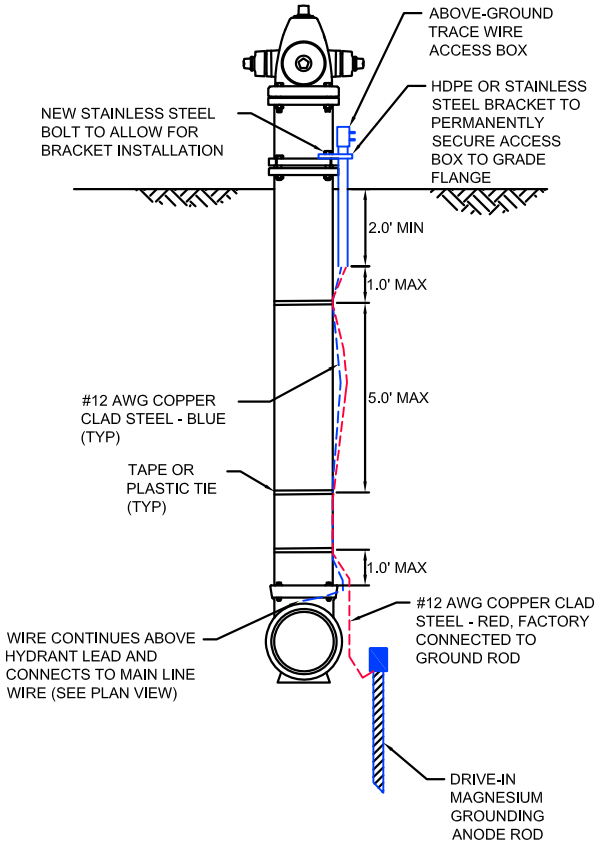


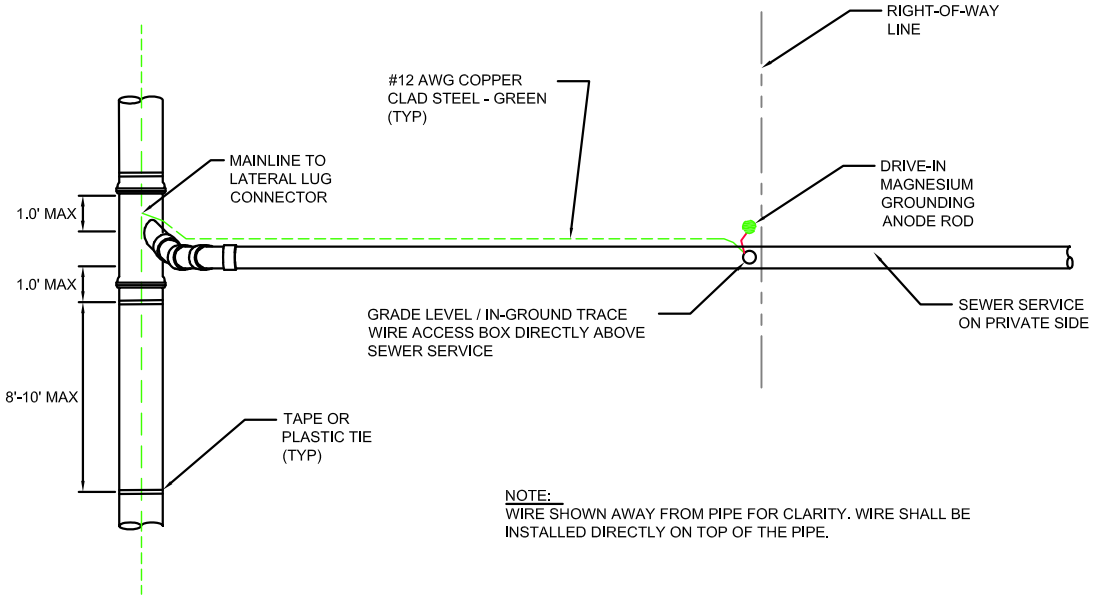
HYDRANT - SECTION VIEW

NO SCALE

NOTES:

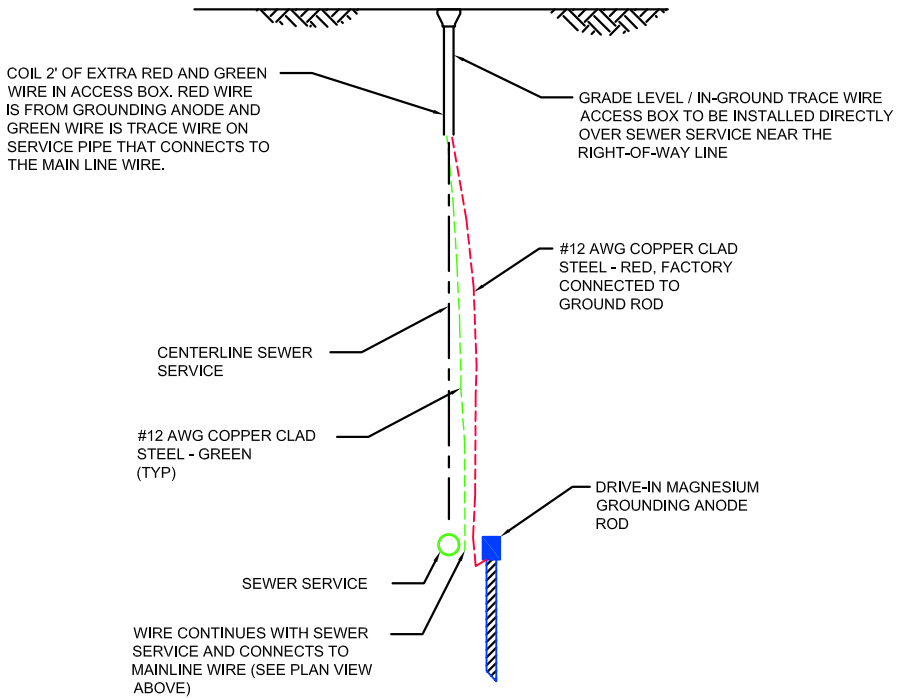
1. TRACER WIRE INSTALLATION INCLUDING MATERIALS (WIRE, CONNECTORS, TERMINATION, & GROUNDING) PER SECTION 632.

DETAIL NO.			REVISED	DETAIL NO.
399-4	MARICOPA ASSOCIATION of GOVERNMENTS STANDARD DETAIL ENGLISH	TRACER WIRE FOR FIRE HYDRANT	01-01-2024	399-4



SEWER SERVICE - PLAN VIEW

NOT TO SCALE



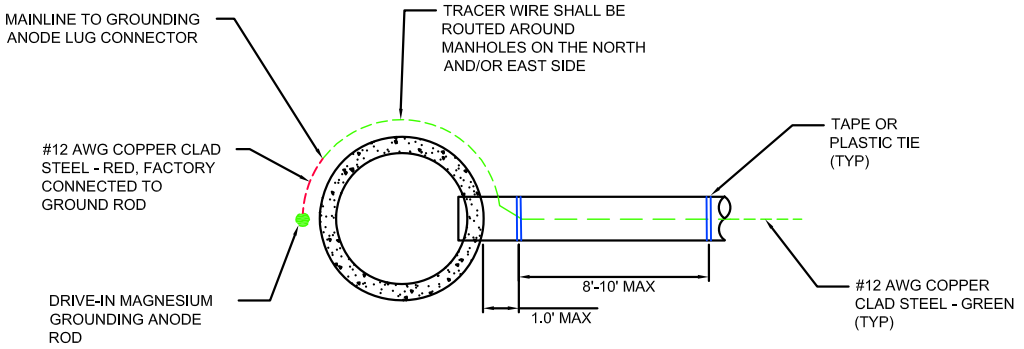
SEWER SERVICE - SECTION VIEW

NOT TO SCALE

NOTES:

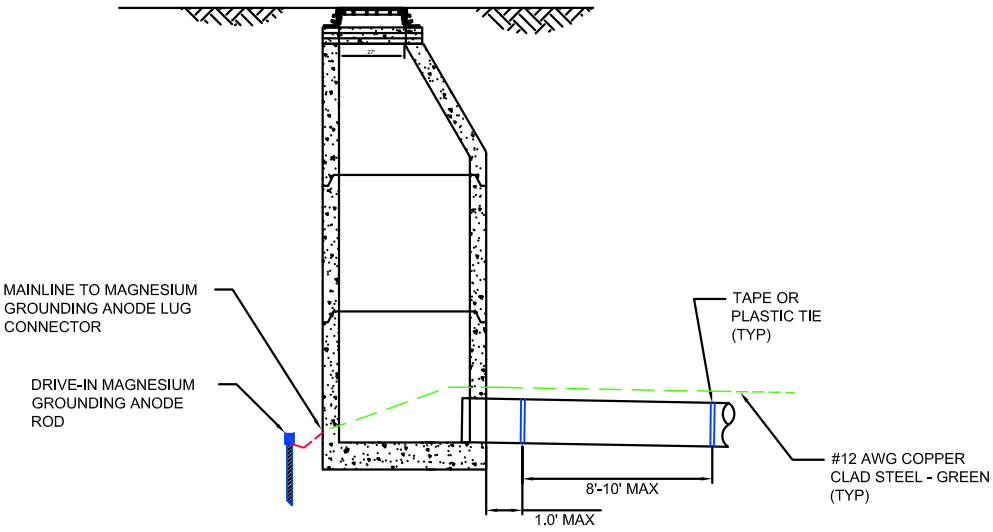
1. TRACER WIRE INSTALLATION INCLUDING MATERIALS (WIRE, CONNECTORS, TERMINATION, & GROUNDING) PER SECTION 632.

DETAIL NO.			REVISED	DETAIL NO.
399-5	MARICOPA ASSOCIATION of GOVERNMENTS STANDARD DETAIL ENGLISH	TRACER WIRE FOR SEWER SERVICE	01-01-2024	399-5



SEWER MANHOLE - PLAN VIEW

NOT TO SCALE



SEWER MANHOLE - SECTION VIEW

NOT TO SCALE

NOTES:

1. TRACER WIRE INSTALLATION INCLUDING MATERIALS (WIRE, CONNECTORS, TERMINATION, & GROUNDING) PER SECTION 632.

DETAIL NO.			REVISED	DETAIL NO.
399-6	MARICOPA ASSOCIATION of GOVERNMENTS STANDARD DETAIL ENGLISH	TRACER WIRE FOR SEWER MANHOLE	01-01-2024	399-6